

Copy for the receiving Office (RO/US)
PATENT COOPERATION TREATY

PCT/US98/23905

PCT

**NOTIFICATION OF THE RECORDING
 OF A CHANGE**

(PCT Rule 92bis.1 and
 Administrative Instructions, Section 422)

From the INTERNATIONAL BUREAU

To:

WHITE, John P.
 Cooper & Dunham LLP
 1185 Avenue of the Americas
 New York, NY 10036
 ÉTATS-UNIS D'AMÉRIQUE

Date of mailing (day/month/year) 19 May 1999 (19.05.99)	IMPORTANT NOTIFICATION
Applicant's or agent's file reference 54203-H-PCT	
International application No. PCT/US98/23905	International filing date (day/month/year) 10 November 1998 (10.11.98)

1. The following indications appeared on record concerning:

☒ the applicant ☐ the inventor ☐ the agent ☐ the common representative

Name and Address DANA-FARBER CANCER INSTITUTE 44 Binney Street Boston, MA 02115 United States of America	State of Nationality US	State of Residence US
	Telephone No.	
	Facsimile No.	
	Teleprinter No.	

2. The International Bureau hereby notifies the applicant that the following change has been recorded concerning:

☐ the person ☒ the name ☐ the address ☐ the nationality ☐ the residence

Name and Address DANA-FARBER CANCER INSTITUTE, INC. 44 Binney Street Boston, MA 02115 United States of America	State of Nationality US	State of Residence US
	Telephone No.	
	Facsimile No.	
	Teleprinter No.	

3. Further observations, if necessary:

4. A copy of this notification has been sent to:

☒ the receiving Office ☒ the designated Offices concerned
☐ the International Searching Authority ☐ the elected Offices concerned
☐ the International Preliminary Examining Authority ☐ other:

The International Bureau of WIPO 34, chemin des Colombettes 1211 Geneva 20, Switzerland Facsimile No.: (41-22) 740.14.35	Authorized officer H. Zhou Telephone No.: (41-22) 338.83.38
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PATENT COOPERATION TREATY

PCT

NOTIFICATION RELATING TO PRIORITY CLAIM

(PCT Rules 26bis.1 and 26bis.2 and
Administrative Instructions, Sections 402 and 409)

From the INTERNATIONAL BUREAU

To:

WHITE, John P.
Cooper & Dunham LLP
1185 Avenue of the Americas
New York, NY 10036
ÉTATS-UNIS D'AMÉRIQUE

Date of mailing (day/month/year)

19 May 1999 (19.05.99)

Applicant's or agent's file reference

54203-H-PCT

International application No.

PCT/US98/23905

International filing date (day/month/year)

10 November 1998 (10.11.98)

Applicant

THE TRUSTEES OF COLUMBIA UNIVERSITY IN THE CITY OF NEW YORK et al

IMPORTANT NOTIFICATION

The applicant is hereby **notified** of the following in respect of the priority claim(s) made in the international application.

1. ☐ **Correction of priority claim.** In accordance with the applicant's notice received on: ,
the following priority claim has been corrected to read as follows:

- ☐ even though the indication of the number of the earlier application is missing.
☐ even though the following indication in the priority claim is not the same as the corresponding indication appearing in the priority document:

2. ☒ **Addition of priority claim.** In accordance with the applicant's notice received on: 10 March 1999 (10.03.99),
the following priority claim has been added:

US 17 June 1998 (17.06.98) 60/089,580

- ☐ even though the indication of the number of the earlier application is missing.
☐ even though the following indication in the priority claim is not the same as the corresponding indication appearing in the priority document:

3. ☐ As a **result of the correction and/or addition** of (a) priority claim(s) under items 1 and/or 2, the (earliest) priority date is:

4. ☐ **Priority claim considered not to have been made.**

- ☐ The applicant failed to respond to the Invitation under Rule 26bis.2(a) (Form PCT/IB/316) within the prescribed time limit.
☐ The applicant's notice was received after the expiration of the prescribed time limit under Rule 26bis.1(a).
☐ The applicant's notice failed to correct the priority claim so as to comply with the requirements of Rule 4.10.

The applicant may, before the technical preparations for international publication have been completed and subject to the payment of a fee, request the International Bureau to publish, together with the international application, information concerning the priority claim. See Rule 26bis.2(c) and the PCT Applicant's Guide, Volume I, Annex B2(IB).

5. ☐ In case where **multiple priorities** have been claimed, the above item(s) relate to the following priority claim(s):

6. A copy of this notification has been sent to the receiving Office and

- ☒ to the International Searching Authority (where the international search report has not yet been issued).
☒ the designated Offices (which have already been notified of the receipt of the record copy).

The International Bureau of WIPO
34, chemin des Colombettes
1211 Geneva 20, Switzerland

Authorized officer

H. Zhou

Facsimile No. (41-22) 740.14.35

Telephone No. (41-22) 338.83.38

The demand must be filed directly with the competent international Preliminary Examining Authority, or, if two or more Authorities are competent, with the one chosen by the applicant. Full name or two-letter code of that Authority may be indicated by the applicant on the line below.
IPEA/ US

PCT

CHAPTER II

DEMAND

under Article 31 of the Patent Cooperation Treaty.
The undersigned requests that the international application specified below be the subject of international preliminary examination according to the Patent Cooperation Treaty.

For International Preliminary Examining Authority use only

Identification of IPEA/ <u>US</u>	418 Rec'd PCT/PTO 09 JUN 1999 Date of receipt of DEMAND
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Box No. I IDENTIFICATION OF THE INTERNATIONAL APPLICATION

Applicant's or agent's file reference
54203-H-PCT

International application No
PCT/US98/23905

International filing date (day/month/year)
(16.11.98)
10 November 1998

(Earliest) Priority date (day/month/year)
(12.11.97)
10 November 1997

Title of invention CRYSTAL COMPRISING HUMAN IMMUNODEFICIENCY VIRUS ENVELOPE GLYCOPROTEIN gp120, COMPOUNDS INHIBITING CD4-gp120 INTERACTION, COMPOUNDS INHIBITING CHEMOKINE RECEPTOR - gp120 INTERACTION, MIMICS OF CD4 AND gp120 VARIANTS

Box No. II APPLICANT(S)

Name and address: (Family name followed by given name, for a legal entity, full official designation. The address must include postal code and name of country.)

THE TRUSTEES OF COLUMBIA UNIVERSITY IN THE CITY OF
NEW YORK
West 116th Street and Broadway
New York, New York 10027
United States of America

Telephone No.:

None

Facsimile No.:

None

Teleprinter No.:

None

State (i.e. country) of nationality:

United States of America

State (i.e. country) of residence:

United States of America

Name and address: (Family name followed by given name, for a legal entity, full official designation. The address must include postal code and name of country.)

DANA-FARBER CANCER INSTITUTE
44 Binney Street
Boston, Massachusetts 02115
United States of America

State (i.e. country) of nationality:

United States of America

State (i.e. country) of residence:

United States of America

Name and address: (Family name followed by given name, for a legal entity, full official designation. The address must include postal code and name of country.)

KWONG, Peter D.
352 West 15th Street
Apt. 403
New York, New York 10011
United States of America

State (i.e. country) of nationality:

United States of America

State (i.e. country) of residence:

United States of America

☒ Further applicants are indicated on a continuation sheet.

Continuation of Box No. II APPLICANT(S)

If none of the following sub-boxes is used, this sheet is not to be included in the demand.

Name and address: (Family name followed by given name; for a legal entity, full official designation. The address must include postal code and name of country.)

HENDRICKSON, Wayne A.
161 Mt. Hope Blvd.
Hastings-on-Hudson, New York 10706
United States of America

State (i.e. country) of nationality:
United States of AmericaState (i.e. country) of residence:
United States of America

Name and address: (Family name followed by given name; for a legal entity, full official designation. The address must include postal code and name of country.)

SODROSKI, Joseph G.
10 Ashland Place
Medford, Massachusetts 02155
United States of America

State (i.e. country) of nationality:
United States of AmericaState (i.e. country) of residence:
United States of America

Name and address: (Family name followed by given name; for a legal entity, full official designation. The address must include postal code and name of country.)

WYATT, Richard T.
11 Delphi Circle
Andover, Massachusetts 01810
United States of America

State (i.e. country) of nationality:
United States of AmericaState (i.e. country) of residence:
United States of America

Name and address: (Family name followed by given name; for a legal entity, full official designation. The address must include postal code and name of country.)

State (i.e. country) of nationality:

State (i.e. country) of residence:



Further applicants are indicated on another continuation sheet.

Box No. III AGENT OR COMMON REPRESENTATIVE: OR ADDRESS FOR CORRESPONDENCE

The following person is ☒ agent ☐ common representative

- and ☒ has been appointed earlier and represents the applicant(s) also for international preliminary examination
- ☐ is hereby appointed and any earlier appointment of (any agent's) common representative is hereby revoked
- ☐ is hereby appointed, specifically for the procedure before the International Preliminary Examining Authority, in addition to the agent's/common representative appointed earlier

Name and address: *(Family name followed by given name, for a legal entity, full official designation)*
The address must include postal code and name of country

WHITE, John P.
Cooper & Dunham LLP
1185 Avenue of the Americas
New York, New York 10036
United States of America

Telephone No.

(212) 278-0400

Facsimile No.

(212) 391-0526

Teleprinter No.

None

- ☐ Mark this check-box where no agent or common representative has been appointed and the space above is used instead to indicate a special address to which correspondence should be sent

Box No. IV STATEMENT CONCERNING AMENDMENTS

The applicant wishes the International Preliminary Examining Authority*

- (i) ☐ to start the international preliminary examination on the basis of the international application as originally filed.
- (ii) ☐ to take into account the amendments under Article 34 of
- ☐ the description (amendments attached).
 - ☐ the claims (amendments attached).
 - ☐ the drawings (amendments attached).
- (iii) ☐ to take into account any amendments of the claims under Article 19 filed with the International Bureau (a copy is attached).
- (iv) ☐ to disregard any amendments of the claims made under Article 19 and to consider them as reversed.
- (v) ☐ to postpone the start of the international preliminary examination until the expiration of 20 months from the priority date unless that Authority receives a copy of any amendments made under Article 19 or a notice from the applicant that he does not wish to make such amendments (Rule 69 1(d)). *This check-box may be marked only where the time limit under Article 19 has not yet expired.*

- * Where no check-box is marked, international preliminary examination will start on the basis of the international application as originally filed or, where a copy of amendments to the claims under Article 19 and/or amendments of the international application under Article 34 are received by the International Preliminary Examining Authority before it has begun to draw up a written opinion or the international preliminary examination report, as so amended

Box No. V ELECTION OF STATES

- ☒ The applicant hereby elects all eligible States (that is, all States which have been designated and which are bound by Chapter II of the PCT) except:

.....

.....

.....

If the applicant does not wish to elect certain eligible States, the name(s) or country code(s) of those States must be indicated above

Box No. VI CHECK LIST

The demand is accompanied by the following documents for the purposes of international preliminary examination:

- | | |
|--|--------------|
| 1. amendments under Article 34 | _____ sheets |
| description | _____ sheets |
| claims | _____ sheets |
| drawings | _____ sheets |
| 2. letter accompanying amendments under Article 34 | _____ sheets |
| 3. copy of amendments under Article 19 | _____ sheets |
| 4. copy of statement under Article 19 | _____ sheets |
| 5. other (specify): | _____ sheets |

For International Preliminary Examining Authority use only

received

not received

☐☐☐☐☐☐☐☐☐☐☐☐☐☐

The demand is also accompanied by the item(s) marked below:

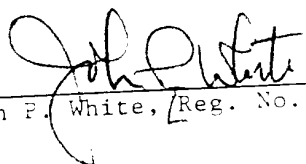
1. ☐ separate signed power of attorney
2. ☐ copy of general power of attorney
3. ☐ statement explaining lack of signature

4. ☒ fee calculation sheet (and check for \$652.00)

5. ☒ other (specify): Express Mail Certificate of Mailing bearing Express Mail label no. EM165674225US

Box No. VII SIGNATURE OF APPLICANT, AGENT OR COMMON REPRESENTATIVE

Next to each signature, indicate the name of the person signing and the capacity in which the person signs (if such capacity is not obvious from reading the demand).


John P. White, [Reg. No. 28,678]

Date 9 June 1999

For International Preliminary Examining Authority use only

1. Date of actual receipt of DEMAND

418 Rec'd PCT/PTO 9 JUN 1999 (09.06.99)

2. Adjusted date of receipt of demand due to CORRECTIONS under Rule 60.1(b)

3. ☐ The date of receipt of the demand is AFTER the expiration of 19 months from the priority date and item 4 or 5, below, does not apply.

☐ The applicant has been informed accordingly.

4. ☐ The date of receipt of the demand is WITHIN the period of 19 months from the priority date as extended by virtue of Rule 80.5.

5. ☐ Although the date of receipt of the demand is after the expiration of 19 months from the priority date, the delay in arrival is EXCUSED pursuant to Rule 82.

For International Bureau use only

Demand received from IPEA on _____

PCT

FEE CALCULATION SHEET

Annex to the Demand for international preliminary examination

International application No.	PCT/US98/23905
Applicant's or agent's file reference	54203-H-PCT

For International Preliminary Examining Authority use only

102 Rec'd PCT/PTO 09 JUN 1999
 Date stamp of the IPEA

Applicant THE TRUSTEES OF COLUMBIA UNIVERSITY IN THE CITY OF NEW YORK, et al.

Calculation of prescribed fees

- | | | |
|--|--------------|---|
| 1. Preliminary examination fee | \$490.00 | P |
| 2. Handling fee (Applicants from certain States are entitled to a reduction of 75% of the handling fee. Where the applicant is (or all applicants are) so entitled, the amount to be entered at H is 25% of the handling fee.) | \$162.00 | H |
| 3. Total of prescribed fees
Add the amounts entered at P and H
and enter total in the TOTAL box | \$652.00 | |
| | TOTAL | |

490

162

652

Mode of Payment

- | | |
|--|---|
| <input type="checkbox"/> authorization to charge deposit account with the IPEA (see below) | <input type="checkbox"/> cash |
| <input checked="" type="checkbox"/> cheque (\$652.00) | <input type="checkbox"/> revenue stamps |
| <input type="checkbox"/> postal money order | <input type="checkbox"/> coupons |
| <input type="checkbox"/> bank draft | <input type="checkbox"/> other (specify): |

Deposit Account Authorization (this mode of payment may not be available at all IPEAs)

The IPEA/ US ☐ is hereby authorized to charge the total fees indicated above to my deposit account.

☒ (this check-box may be marked only if the conditions for deposit accounts of the IPEA so permit) is hereby authorized to charge any deficiency or credit any overpayment in the total fees indicated above to my deposit account.

03-3125
 Deposit Account Number

9 June 1999
 Date (day/month/year)

Signature John P. White
 John P. White, Reg. No. 28,678

See Notes to the fee calculation sheet

PATENT COOPERATION TREATY

From the
INTERNATIONAL PRELIMINARY EXAMINING AUTHORITY

PCT

NOTIFICATION OF TRANSMITTAL OF INTERNATIONAL PRELIMINARY EXAMINATION REPORT

(PCT Rule 71.1)

To: JOHN P. WHITE
COOPER & DUNHAM LLP
1185 AVENUE OF THE AMERICAS
NEW YORK, NEW YORK 10036

Date of Mailing
(day/month/year) **24 FEB 2000**

Applicant's or agent's file reference

54203-H-PCT

IMPORTANT NOTIFICATION

International application No.

PCT/US98/23905

International filing date (day/month/year)

10 NOVEMBER 1998

Priority Date (day/month/year)

10 NOVEMBER 1997

Applicant

THE TRUSTEES OF COLUMBIA UNIVERSITY IN THE CITY OF NEW YORK

1. The applicant is hereby notified that this International Preliminary Examining Authority transmits herewith the international preliminary examination report and its annexes, if any, established on the international application.
2. A copy of the report and its annexes, if any, is being transmitted to the International Bureau for communication to all the elected Offices.
3. Where required by any of the elected Offices, the International Bureau will prepare an English translation of the report (but not of any annexes) and will transmit such translation to those Offices.

4. REMINDER

The applicant must enter the national phase before each elected Office by performing certain acts (filing translations and paying national fees) within 30 months from the priority date (or later in some Offices)(Article 39(1))(see also the reminder sent by the International Bureau with Form PCT/IB/301).

Where a translation of the international application must be furnished to an elected Office, that translation must contain a translation of any annexes to the international preliminary examination report. It is the applicant's responsibility to prepare and furnish such translation directly to each elected Office concerned.

For further details on the applicable time limits and requirements of the elected Offices, see Volume II of the PCT Applicant's Guide.

Name and mailing address of the IPEA US
Commissioner of Patents and Trademarks
Box PCT
Washington, D.C. 20231

Facsimile No. (703) 305-3230

Authorized officer

Jeffrey Stucker

Telephone No. (703) 308-0196

PATENT COOPERATION TREATY

PCT

INTERNATIONAL PRELIMINARY EXAMINATION REPORT

(PCT Article 36 and Rule 70)

Applicant's or agent's file reference 54203-H-PCT	FOR FURTHER ACTION See Notification of Transmittal of International Preliminary Examination Report (Form PCT/IPEA/416)	
International application No. PCT/US98/23905	International filing date (day/month/year) 10 NOVEMBER 1998	Priority date (day/month/year) 10 NOVEMBER 1997
International Patent Classification (IPC) or national classification and IPC Please See Supplemental Sheet.		
Applicant THE TRUSTEES OF COLUMBIA UNIVERSITY IN THE CITY OF NEW YORK		

1. This international preliminary examination report has been prepared by this International Preliminary Examining Authority and is transmitted to the applicant according to Article 36.
2. This REPORT consists of a total of 5 sheets.

☐ This report is also accompanied by ANNEXES, i.e., sheets of the description, claims and/or drawings which have been amended and are the basis for this report and/or sheets containing rectifications made before this Authority (see Rule 70.16 and Section 607 of the Administrative Instructions under the PCT).

These annexes consist of a total of 2 sheets.

3. This report contains indications relating to the following items:

I ☒ Basis of the report

II ☐ Priority

III ☒ Non-establishment of report with regard to novelty, inventive step or industrial applicability

IV ☐ Lack of unity of invention

V ☒ Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement

VI ☐ Certain documents cited

VII ☐ Certain defects in the international application

VIII ☐ Certain observations on the international application

Date of submission of the demand 09 JUNE 1999	Date of completion of this report 17 FEBRUARY 2000
Name and mailing address of the IPEA-US Commissioner of Patents and Trademarks Box PCT Washington, D.C. 20231	Authorized officer Jeffrey Stucker Telephone No. (703) 308-0196
Facsimile No. (703) 305-3230	

INTERNATIONAL PRELIMINARY EXAMINATION REPORT

International application No.

PCT/US98/23905

I. Basis of the report

1. This report has been drawn on the basis of *(Substitute sheets which have been furnished to the receiving Office in response to an invitation under Article 14 are referred to in this report as "originally filed" and are not annexed to the report since they do not contain amendments):*

☒ the international application as originally filed.

☒ the description, pages 1-201, as originally filed.

pages NONE, filed with the demand.

pages NONE, filed with the letter of _____.

pages _____, filed with the letter of _____.

☒ the claims, Nos. 1-96, as originally filed.

Nos. NONE, as amended under Article 19.

Nos. NONE, filed with the demand.

Nos. NONE, filed with the letter of _____.

Nos. _____, filed with the letter of _____.

☒ the drawings, sheets/fig 1-197, as originally filed.

sheets/fig NONE, filed with the demand.

sheets/fig NONE, filed with the letter of _____.

sheets/fig _____, filed with the letter of _____.

2. The amendments have resulted in the cancellation of:

☒ the description, pages NONE.

☒ the claims, Nos. NONE.

☒ the drawings, sheets/fig NONE.

3. ☐ This report has been established as if (some of) the amendments had not been made, since they have been considered to go beyond the disclosure as filed, as indicated in the ~~Supplemental Box~~ Additional observations below (Rule 70.2(c)).

4. Additional observations, if necessary:

NONE

INTERNATIONAL PRELIMINARY EXAMINATION REPORT

International application No.
PCT/US98/23905

III. Non-establishment of opinion with regard to novelty, inventive step and industrial applicability

The question whether the claimed invention appears to be novel, to involve an inventive step (to be non-obvious), or to be industrially applicable have not been and will not be examined in respect of:

- ☐ the entire international application.
- ☒ claims Nos. 4-16, 18-20, 22-24, and 27-96

because:

- ☐ the said international application, or the said claim Nos. _ relate to the following subject matter which does not require international preliminary examination (*specify*).

- ☐ the description, claims or drawings (*indicate particular elements below*) or said claims Nos. _ are so unclear that no meaningful opinion could be formed (*specify*).

- ☐ the claims, or said claims Nos. _ are so inadequately supported by the description that no meaningful opinion could be formed.

- ☒ no international search report has been established for said claims Nos. (See Attached).

INTERNATIONAL PRELIMINARY EXAMINATION REPORT

International application No.

PCT/US98/23905

V. Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement**1. STATEMENT**

Novelty (N)

Claims 3, 17, 21, 25, and 26

YES

Claims 1 and 2

NO

Inventive Step (IS)

Claims NONE

YES

Claims 1-3, 17, 21, 25, and 26

NO

Industrial Applicability (IA)

Claims 1-3, 17, 21, 25, and 26

YES

Claims NONE

NO

2. CITATIONS AND EXPLANATIONS

Claims 1 and 2 lack novelty under PCT Article 33(2) as being anticipated by Wilson et al.

Claims 1-3, 17, 21, 25, and 26 lack an inventive step under PCT Article 33(3) as being obvious over Wilson et al. The process of changing the resolution level of the X-ray measurements is well within the abilities of the artisan to modify and optimize. The composition of gp120, with or without glycosylation is well known to the artisan and its preparation for X-ray crystallography is taught in the reference.

Claims 1-3, 17, 21, 25, and 26 meet the criteria set out in PCT Article 33(4), because the instant invention has industrial applicability.

----- NEW CITATIONS -----

NONE

INTERNATIONAL PRELIMINARY EXAMINATION REPORT

International application No.

PCT/US98/23905

Supplemental Box

(To be used when the space in any of the preceding boxes is not sufficient)

Sheet 10

Continuation of: Boxes I - VIII

CLASSIFICATION:

The International Patent Classification (IPC) and/or the National classification are as listed below:
IPC(7): A61K 38/00; C07K 5/00; G01N 23/20, 23/201, 23/207 and US Cl.: 530/323, 350, 826; 378/71, 73, 86

III. NON-ESTABLISHMENT OF REPORT:

No international search report has been established for claim numbers 4-16, 18-20, 22-24, and 27-96.

PATENT COOPERATION TREATY

From the INTERNATIONAL SEARCHING AUTHORITY

PCT

NOTIFICATION OF TRANSMITTAL OF THE INTERNATIONAL SEARCH REPORT OR THE DECLARATION

(PCT Rule 44.1)

To: JOHN P. WHITE
COOPER & DUNHAM LLP
1185 AVENUE OF THE AMERICAS
NEW YORK, NEW YORK 10036

Date of Mailing
(day/month/year)

22 FEB 1999

Applicant's or agent's file reference
54203-H-PCT

FOR FURTHER ACTION See paragraphs 1 and 4 below

International application No.
PCT/US98/23905

International filing date
(day/month/year)
10 NOVEMBER 1998

Applicant
THE TRUSTEES OF COLUMBIA UNIVERSITY IN THE CITY OF NEW YORK

1. ☒ The applicant is hereby notified that the international search report has been established and is transmitted herewith.

Filing of amendments and statement under Article 19:

The applicant is entitled, if he so wishes, to amend the claims of the international application (see Rule 46):

When? The time limit for filing such amendments is normally 2 months from the date of transmittal of the international search report; however, for more details, see the notes on the accompanying sheet.

Where? Directly to the International Bureau of WIPO
34, chemin des Colombettes
1211 Geneva 20, Switzerland
Facsimile No.: (41-22) 740.14.35

For more detailed instructions, see the notes on the accompanying sheet.

2. ☐ The applicant is hereby notified that no international search report will be established and that the declaration under Article 17(2)(a) to that effect is transmitted herewith.

3. ☐ With regard to the protest against payment of (an) additional fee(s) under Rule 40.2, the applicant is notified that:

- ☐ the protest together with the decision thereon has been transmitted to the International Bureau together with the applicant's request to forward the texts of both the protest and the decision thereon to the designated Offices.
- ☐ no decision has been made yet on the protest; the applicant will be notified as soon as a decision is made.

4. **Further action(s):** The applicant is reminded of the following:

Shortly after **18 months** from the priority date, the international application will be published by the International Bureau. If the applicant wishes to avoid or postpone publication, a notice of withdrawal of the international application, or of the priority claim, must reach the International Bureau as provided in rules 90 *bis* 1 and 90 *bis* 3, respectively, before the completion of the technical preparations for international publication.

Within **19 months** from the priority date, a demand for international preliminary examination must be filed if the applicant wishes to postpone the entry into the national phase until 30 months from the priority date (in some Offices even later).

Within **20 months** from the priority date, the applicant must perform the prescribed acts for entry into the national phase before all designated Offices which have not been elected in the demand or in a later election within 19 months from the priority date or could not be elected because they are not bound by Chapter II.

Name and mailing address of the ISA/US
Commissioner of Patents and Trademarks
Box PCT
Washington, D.C. 20231

Facsimile No. (703) 305-3230

Authorized officer
Jeffrey Stucker

Telephone No. (703) 308-0196

(See notes on accompanying sheet)

PATENT COOPERATION TREATY

PCT

INTERNATIONAL SEARCH REPORT

(PCT Article 18 and Rules 43 and 44)

Applicant's or agent's file reference 54203-H-PCT	FOR FURTHER ACTION	see Notification of Transmittal of International Search Report (Form PCT/ISA/220) as well as, where applicable, item 5 below.
International application No. PCT/US98/23905	International filing date (day/month/year) 10 NOVEMBER 1998	(Earliest) Priority Date (day/month/year) 10 NOVEMBER 1997
Applicant THE TRUSTEES OF COLUMBIA UNIVERSITY IN THE CITY OF NEW YORK		

This international search report has been prepared by this International Searching Authority and is transmitted to the applicant according to Article 18. A copy is being transmitted to the International Bureau.

This international search report consists of a total of 4 sheets.

☒ It is also accompanied by a copy of each prior art document cited in this report.

1. ☐ Certain claims were found unsearchable (See Box I).

2. ☒ Unity of invention is lacking (See Box II).

3. ☐ The international application contains disclosure of a nucleotide and/or amino acid sequence listing and the international search was carried out on the basis of the sequence listing

☐ filed with the international application.

☐ furnished by the applicant separately from the international application,

☐ but not accompanied by a statement to the effect that it did not include matter going beyond the disclosure in the international application as filed.

☐ transcribed by this Authority.

4. With regard to the title, ☐ the text is approved as submitted by the applicant.

☒ the text has been established by this Authority to read as follows:

The title of the invention does not comply with PCT Rule 4.3 because it is not short and precise, the new title is: 'X-RAT CRYSTAL COMPRISING HIV-1 GP120.'

5. With regard to the abstract,

☒ the text is approved as submitted by the applicant.

☐ the text has been established, according to Rule 38.2(b), by this Authority as it appears in Box III. The applicant may, within one month from the date of mailing of this international search report, submit comments to this Authority.

6. The figure of the drawings to be published with the abstract is:

Figure No. ☐ as suggested by the applicant.

☐ because the applicant failed to suggest a figure.

☐ because this figure better characterizes the invention.

☒ None of the figures.

INTERNATIONAL SEARCH REPORT

International application No.
PCT/US98/23905

Box I Observations where certain claims were found unsearchable (Continuation of item 1 of first sheet)

This international report has not been established in respect of certain claims under Article 17(2)(a) for the following reasons:

1. ☐ Claims Nos.:
because they relate to subject matter not required to be searched by this Authority, namely:

2. ☐ Claims Nos.:
because they relate to parts of the international application that do not comply with the prescribed requirements to such an extent that no meaningful international search can be carried out, specifically:

3. ☐ Claims Nos.:
because they are dependent claims and are not drafted in accordance with the second and third sentences of Rule 6.4(a).

Box II Observations where unity of invention is lacking (Continuation of item 2 of first sheet)

This International Searching Authority found multiple inventions in this international application, as follows:

Please See Extra Sheet.

1. ☐ As all required additional search fees were timely paid by the applicant, this international search report covers all searchable claims.
2. ☐ As all searchable claims could be searched without effort justifying an additional fee, this Authority did not invite payment of any additional fee.
3. ☐ As only some of the required additional search fees were timely paid by the applicant, this international search report covers only those claims for which fees were paid, specifically claims Nos.:

4. ☒ No required additional search fees were timely paid by the applicant. Consequently, this international search report is restricted to the invention first mentioned in the claims; it is covered by claims Nos.:
1-3, 17, 21, 25, and 26

Remark on Protest

- ☐ The additional search fees were accompanied by the applicant's protest.
☐ No protest accompanied the payment of additional search fees.

INTERNATIONAL SEARCH REPORT

International application No.
PCT/US98/23905

A. CLASSIFICATION OF SUBJECT MATTER

IPC(6) : A61K 38/00; C07K 5/00; G01N 23/20, 23/201, 23/207

US CL : 530/323, 350, 826; 378/71, 73, 86

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

U.S. : 530/323, 350, 826; 378/71, 73, 86

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched
noneElectronic data base consulted during the international search (name of data base and, where practicable, search terms used)
APS, Medline, Aidsline

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X - Y	Database AIDSLINE, International Conference on AIDS, Vol. 9, No.1, 1993 (La Jolla, CA, USA), p. 37, abstract No. WS-A21-1, WILSON et al. 'Structural Basis for Recognition of HIV-1 by Two Broadly Neutralizing Monoclonal Antibodies'.	1, 2 ----- 3, 17, 21, 25, 26

☐ Further documents are listed in the continuation of Box C. ☐ See patent family annex.

* Special categories of cited documents:	*T* later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention
A document defining the general state of the art which is not considered to be of particular relevance	*X* document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone
E earlier document published on or after the international filing date	*Y* document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art
L document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)	* & * document member of the same patent family
O document referring to an oral disclosure, use, exhibition or other means	
P document published prior to the international filing date but later than the priority date claimed	

Date of the actual completion of the international search

29 JANUARY 1999

Date of mailing of the international search report

22 FEB 1999

Name and mailing address of the ISA/US
Commissioner of Patents and Trademarks
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Jeffrey Stucker

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INTERNATIONAL SEARCH REPORT

International application No.
PCT/US98/23905

BOX II. OBSERVATIONS WHERE UNITY OF INVENTION WAS LACKING

This ISA found multiple inventions as follows:

This application contains the following inventions or groups of inventions which are not so linked as to form a single inventive concept under PCT Rule 13.1. In order for all inventions to be searched, the appropriate additional search fees must be paid.

- Group I, claim(s) 1-3, 17, 21, 25, and 26, drawn to a crystal comprising a portion of gp120 and a method of producing the crystal.
- Group II, claim(s) 4, 5, 8-11, and 24, drawn to a crystal comprising the CD4 binding region of gp120 and method of producing the crystal.
- Group III, claim(s) 6-11, drawn to a crystal comprising the chemokine binding region of gp120 and method of producing the crystal.
- Group IV, claim(s) 12-15, 22, and 23, drawn to a crystal comprising gp120 lacking loops and a method of producing the crystal.
- Group V, claim(s) 18-20, drawn to a crystal comprising a portion of gp120 and a Fab and a method of producing the crystal.
- Group VI, claim(s) 27, 29, 40, 41, 51, and 52, drawn to a method of identifying compounds that bind to a portion of gp120.
- Group VII, claim(s) 37 and 39, drawn to a method of identifying compounds that bind to the CD4 binding portion of gp120.
- Group VIII, claim(s) 48 and 50, drawn to a method of identifying compounds that bind to the chemokine binding portion of gp120.
- Group IX, claim(s) 31-33, drawn to pharmaceutical compounds that bind to a portion of gp120.
- Group X, claim(s) 42-44, 46, and 47, drawn to pharmaceutical compounds that bind to the CD4 binding portion of gp120.
- Group XI, claim(s) 53-55, 57, and 58, drawn to pharmaceutical compounds that bind to the chemokine binding portion of gp120.
- Group XII, claim(s) 28, 29, 40, 41, 51, and 52, drawn to a method of designing compounds that bind to a portion of gp120.
- Group XIII, claim 38, drawn to a method of designing compounds that bind to the CD4 binding portion of gp120.
- Group XIV, claim(s) 49 and 50, drawn to a method of designing compounds that bind to the chemokine binding portion of gp120.
- Group XV, claim(s) 34 and 35, drawn to a compound that binds to a portion of gp120.
- Group XVI, claim(s) 45-47, drawn to a compound that binds to the CD4 binding portion of gp120.
- Group XVII, claim(s) 56-58, drawn to compounds that bind to the chemokine binding portion of gp120.
- Group XVIII, claim(s) 36, drawn to a method of inhibiting the interaction of gp120 and CD4.
- Group XIX, claim(s) 59 and 60, drawn to a method of inhibiting the interaction of gp120 and a chemokine receptor.
- Group XX, claim(s) 61-85, drawn to a substance mimicking gp120 binding region of CD4.
- Group XXI, claim(s) 86-96, drawn to a variant of gp120.

The inventions listed as Groups I-XIX do not relate to a single inventive concept under PCT Rule 13.1 because, under PCT Rule 13.2, they lack the same or corresponding special technical features for the following reasons: each of the groups is directed to different compositions which have materially different structures. The claimed methods are likewise materially different.